FRBSF Weekly Letter

March 25, 1988

Changes in Bank Risk

In the 1980s, two countervailing trends have been evident among the large bank holding companies. On the one hand, their capital positions have improved while, on the other, their asset portfolios have become more risky.

From a regulatory perspective, the general improvement in capital positions is a positive development, since it serves to reduce default risk among banking institutions and to protect the deposit insurance system, other things being equal. However, default risk and the liability of the deposit insurance system also depend on the degree of asset risk assumed by banks. To the extent that asset risk has increased in recent years, the beneficial effects of the higher capital levels in banking may have been offset.

This *Letter* discusses the changes in capital positions and asset risk among a sample of large bank holding companies (BHCs) during the 1980s and evaluates the net effects of these changes on the liability of the deposit insurance system.

Improved capital ratios

Bank regulators typically measure the capital position of a bank as the ratio of its capital to assets. One measure of regulatory capital is "primary capital," which comprises mainly the book value of common equity, loan loss reserves, and perpetual preferred equity. The solid line in Chart 1 traces the trend in the average book value, capital-asset ratio for a sample of 98 large BHCs from 1975 to 1986. The book-value ratio rose from about 4¾ percent at the beginning of 1980 to more than seven percent in the third quarter of 1987.

The rebound of capital ratios for the large BHCs is even more remarkable when measured on a market value basis. An approximate measure of the market value of primary capital is the sum of the market value of common equity (that is, the stock price times the number of common shares outstanding) and the par value of preferred equity. From early 1980 to the third quarter of 1987, the average ratio of market value, primary capital to book value assets more than doubled.

To a large extent, the rise in capital ratios among banking organizations may be a response to regulatory policy. The bank regulatory authorities began to place more emphasis on capital regulation in the early 1980s, starting with an announcement in 1981 of the first explicit minimum capital ratios for banks and bank holding companies. These requirements, which became effective in mid-1982, were strengthened in 1983 and in 1985. The new capital requirements have made minimum capital standards more or less uniform for all banking organizations and raised the effective capital standards for many of the larger institutions.

Still more changes in capital requirements are being proposed, with emphasis on international standards for higher capital requirements that are related to the asset risk of a bank. This focus on risk-related standards reflects the concern that simple minimum standards for capital adequacy have not kept pace with possible increases in asset risk.

Greater asset risk

One of the regulators' worries has been the relative decline in banks' holdings of low-risk, liquid assets, such as Treasury and agency securities. Another concern is the growing volume of problem loans related to the troubled energy, real estate, and foreign sectors. As a result, banks have posted sharp increases both in loan losses and in their ratios of loan loss reserves to total loans.

These simple measures of risk indicate that the quality of bank asset portfolios has deteriorated. Finance theory suggests a more comprehensive measure of asset risk: the variation of the economic rate-of-return on assets. This measure of risk can be expressed as the standard deviation of the rate-of-return on the market value of a bank's assets. The higher is the standard deviation, the greater is the degree of asset risk.

The problem with this measure is that the market value of many bank assets and, therefore, the corresponding asset-return standard deviation are not directly observable. However, this measure can be estimated using information on the standard deviation of the rate-of-return on the share prices of a bank holding company's common equity. The simplest approach is to approximate the asset-return standard deviation as the standard deviation of the return on common equity, weighted by the bank's ratio of market value capital to assets. This approach recognizes that the risk of an institution is determined by its asset risk *and* leverage. It also assumes bank liabilities are not risky.

Such a measure of the average asset risk of 98 large BHCs is plotted in Chart 2 for the years 1975 to 1986. The chart shows that bank asset risk has been higher in the 1980s than in the second half of the 1970s. This rise in asset risk in the 1980s is statistically significant.

Insurance system risk

A central policy question, and the primary concern of this *Letter*, is the extent to which the higher degree of asset risk has offset the benefits of the improved capital positions of bank holding companies. A related concern is whether, on balance, the risk exposure of the deposit insurance system has increased.

Robert Merton has provided a convenient framework for such an inquiry. He has shown that the value of the deposit insurance guarantee is like a (Black-Scholes) put option. The value of the insurance guarantee (that is, the option) is related to the amount of leverage of a banking institution and the standard deviation of the economic rate-of-return on the bank's assets — the two variables discussed above. The lower the leverage, the lower will be the value of the guarantee since it is less likely that a bank will fail and exercise the option and impose losses on the insurance system. Likewise, the lower the asset risk, the lower will be the value of the guarantee.

The change in the value of the deposit insurance guarantee was estimated for each of 98 large bank holding companies using data for 1981 and again for 1986. (In making these calculations, a more refined estimate of the asset-return standard deviation was used than the one described above.) Since a number of simplifying assumptions were necessary, estimates of the value of deposit insurance to the sample of bank holding companies must be viewed with caution, particularly with regard to the *level* of the value of the guarantee. Nonetheless, *changes* in those values should give a reasonable indication of the magnitude of the changes in the risk to the deposit insurance system.

The averages of the estimated value of deposit insurance among the sample of bank holding companies are presented in Chart 3. For reference, the maximum statutory deposit insurance premium is about eight cents per $100 of deposits. The chart shows a large and statistically significant increase in the average value of deposit insurance. This finding suggests that the increase in asset risk has more than offset the benefits from the decline in leverage among the sample of bank holding companies on balance, leaving the deposit insurance system at greater risk. It also suggests that, on average, deposit insurance was underpriced in 1986, but not in 1981. The latter result is consistent with other studies that have estimated the value of deposit insurance in the earlier part of the 1980s.

Cause or effect?

This evidence suggests that, adjusting for increased asset risk, the "effective" average capital position among the sample of large BHCs has become weaker, not stronger. An appropriate regulatory response might be to require even higher standards for capital adequacy.

Some might argue, however, that the observed increases in bank asset risk were a direct consequence of the required buildup in capital. Thus, a regulatory push for even more capital would lead to more risk-taking. This commonly held view states that when banks are forced to raise capital, they will shift to higher yielding, riskier investments to maintain a target rate-of-return on equity.

The theoretical underpinnings of this argument, however, are not very sound. In fact, as discussed at length in a previous *Letter* (May 22, 1987), there are strong theoretical grounds for believing that higher capital levels in banking actually reduce a bank's gains from increasing asset risk. Moreover, the common wisdom is not supported by empirical evidence. If incentives

Chart 1
Primary Capital to Total Assets

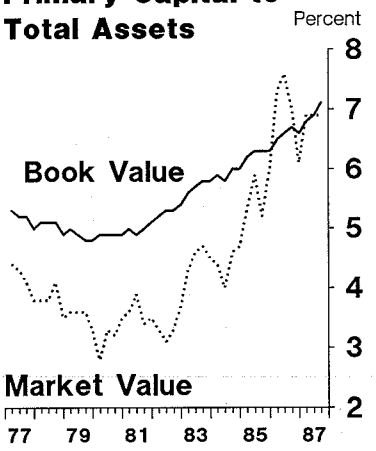


Chart 2
Asset Risk

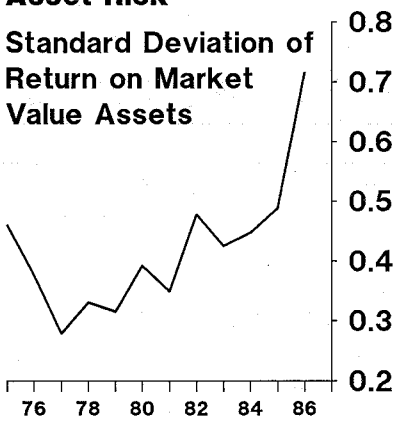
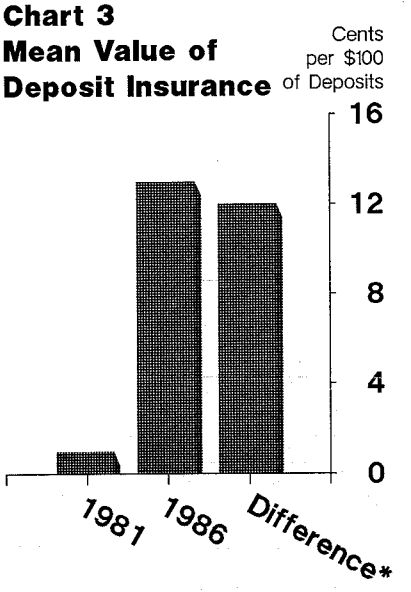


Chart 3
Mean Value of Deposit Insurance



*** Significant at the 95 percent level of confidence.**

for risk-taking increase in response to higher regulatory capital requirements, then the effect should be most evident among the "under-capitalized" BHCs that had to raise capital to meet the new capital requirements in the 1980s. This is not the case. Among the sample of 98 BHCs, neither the increase in asset risk nor the change in the value of deposit insurance were greater for the BHCs that had to raise capital to meet the minimum requirements in the 1980s than for the other BHCs.

Conclusion

The benefit to the deposit insurance system from the improvement in the capital positions of large BHCs apparently has been more than offset by increased asset risk in the 1980s. Put another way, the findings in this *Letter* indicate that, given the increase in asset risk among the large BHCs, the effective capital positions of large BHCs now likely are *weaker* than at the beginning of the decade, despite the increases in capital to asset ratios. The deterioration in the effective capital positions among the large BHCs argues for vigorous regulatory efforts to raise further the level of capital in banking and to ensure more rapid adjustments in capital requirements to changes in asset risk in the future.

Frederick T. Furlong

Opinions expressed in this newsletter do not necessarily reflect the views of the management of the Federal Reserve Bank of San Francisco, or of the Board of Governors of the Federal Reserve System.
Editorial comments may be addressed to the editor (Barbara Bennett) or to the author. . . . Free copies of Federal Reserve publications can be obtained from the Public Information Department, Federal Reserve Bank of San Francisco, P.O. Box 7702, San Francisco 94120. Phone (415) 974-2246.

Research Department
Federal Reserve
Bank of
San Francisco

Alaska Arizona California Hawaii Idaho
Nevada Oregon Utah Washington

BANKING DATA—TWELFTH FEDERAL RESERVE DISTRICT

(Dollar amounts in millions)

Selected Assets and Liabilities Large Commercial Banks	Amount Outstanding 3/02/88	Change from 2/24/88	Change from 3/04/87 Dollar	Percent[7]
Loans, Leases and Investments[1] [2]	204,425	960	1,146	0.5
Loans and Leases[1] [6]	180,866	758	− 2,310	− 1.2
Commercial and Industrial	51,523	494	− 751	− 1.4
Real estate	70,834	83	4,295	6.4
Loans to Individuals	36,107	− 77	− 3,764	− 9.4
Leases	5,761	− 20	394	7.3
U.S. Treasury and Agency Securities	16,519	224	3,277	24.7
Other Securities[2]	7,041	− 22	180	2.6
Total Deposits	204,304	3,998	− 1,496	− 0.7
Demand Deposits	50,477	3,271	− 2,556	− 4.8
Demand Deposits Adjusted[3]	33,793	1,207	− 1,136	− 3.2
Other Transaction Balances[4]	20,513	607	914	4.6
Total Non-Transaction Balances[6]	133,314	120	146	0.1
Money Market Deposit Accounts—Total	43,275	84	− 2,254	− 4.9
Time Deposits in Amounts of $100,000 or more	30,542	− 72	− 1,064	− 3.3
Other Liabilities for Borrowed Money[5]	21,557	− 446	− 5,969	− 21.6

Two Week Averages of Daily Figures	Period ended 2/22/88	Period ended 2/8/88
Reserve Position, All Reporting Banks		
Excess Reserves (+)/Deficiency (−)	28	98
Borrowings	6	9
Net free reserves (+)/Net borrowed(−)	22	90

[1] Includes loss reserves, unearned income, excludes interbank loans
[2] Excludes trading account securities
[3] Excludes U.S. government and depository institution deposits and cash items
[4] ATS, NOW, Super NOW and savings accounts with telephone transfers
[5] Includes borrowing via FRB, TT&L notes, Fed Funds, RPs and other sources
[6] Includes items not shown separately
[7] Annualized percent change